

Failure Modes and Effects Analysis/Critical Items List

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 Title: Risk Assessment Executive Summary Report (RAESR) for the USA SAFER

Item Name: HCM Electrical Umbilical Qty: 1 FMEA Number: US-SFR-450
 Item Part Number: SED33106163 ORU Name: SAFER
 Subsystem Name: HCM ORU Part Number: SED33105900-311
 Function: Electrical interface between Hand Controller Module and SAFER Avionics.

Item Type Designator: C PG/IP Identifier: N/A
 Reference Designator/Find No.: N/A Drawing Number: SED33106163
 Logistics Control Number: N/A

End Item Name: SAFER
 End Item Capability: Six degrees of freedom through 24 thrusters, each rated at 0.8 ± 0.08 lbs. force in vacuum.
 End Item Function: Provides emergency EVA self-rescue for separated crewmember.
 ISS Zone: EVA Shuttle Zone: EVA

Criticality

Critical Item: Yes: _____ No: X Criticality Category: ISS: 1R Shuttle: 1R/3
 Success Paths Remaining:

Failure (Mode, Cause, Detection, Corrective Action)

Failure Mode: HCM electrical umbilical fails to transmit signal/power.
 Failure Mode Code:
 Failure Cause: Short/open circuit, contamination, radiation event, EMI.
 Failure Detection:
 Flight: IVA – IVA checkout.
 EVA – No thrust responses. No display.
 Ground: Functional Test.
 Time To Detect Quantity: 10 Time To Detect Units: Seconds
 Correcting Action: IVA – If failure is detected during IVA checkout, use back-up SAFER if available.
 EVA – Cycle power. If not successful, no other corrective action.
 Remarks: None
 Failure Effect Phase: EVA Operations Affected Stage(S): EVA Operations

Failure Effect

On ORU/Assembly:
 First/Second Failure: Inadvertent EVA crewmember separation.
 Third (this) Failure: Unable to arrest previous motion.
 On Subsystem/Next Assembly: None.
 On End Item/Segment: Prevents self rescue. Possible loss of mission objectives if SAFER required for EVA.
 On Crew/ISS: Possible loss of EVA crewmember/damage to EMU/Orbiter/ISS.
 Time To Effect Quantity: 1 Time To Effect Units: Minutes

Redundancy Screen

ISS (Shuttle)
 Checkout Pre-Launch (A): Pass
 Checkout On-Orbit (B): N/A
 Detection Flight Crew: Pass Or Detection Ground Crew: Fail
 Loss Of Redundancy
 From A Single Cause (C): N/A